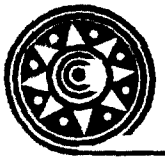

ORIGINAL

Information Renaissance

Department of Physics and Astronomy University of Pittsburgh Pittsburgh, Pennsylvania 15260

April 11, 1996

Office of the Secretary
Federal Communications Commission
Washington, DC 20554

Dear Mr. Secretary:

Enclosed is the original set of comments, along with six copies, in the matter of the Federal-State Joint Board on Universal Service, CC Docket No. 96-45. These comments are respectfully submitted on behalf of Information Renaissance, a nonprofit organization which seeks to further the development of computer networks in support of education, community development and economic revitalization. We appreciate your consideration of these comments.

Sincerely,
Robert D. Carlitz

Executive Director
Information Renaissance

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Comments Before the
Federal Communications Commission
Washington, DC 20554

In the Matter of	)	
	)	
Federal-State Joint Board on	)	CC Docket No. 96-45
Universal Service	)	
	)	

Re: Notice of Proposed Rulemaking and Order Establishing Joint Board

Comments from Information Renaissance

prepared by

Robert D. Carlitz
Eugene F. Hastings, II
Mario Zinga

(April 12, 1996)

Background.

Information Renaissance is a nonprofit organization that has been created to further the development of computer networks which support education, community development and economic revitalization. The organization is an outgrowth of several large-scale networking projects that have been under way in Pittsburgh, Pennsylvania over the last four years. These projects include ***Common Knowledge: Pittsburgh***, a National Science Foundation sponsored testbed for school networking, and ***Bridging the Urban Landscape***, a community networking project sponsored by the Telecommunications and Information Infrastructure Assistance Program of the United States Department of Commerce.

These projects were developed by a collaboration of the University of Pittsburgh, the Pittsburgh Supercomputing Center and the Pittsburgh Public Schools and were implemented in classrooms of the Pittsburgh Public Schools and community sites in the city. The authors of the present comments have been active participants in this work and draw upon their experience for the recommendations which follow.

Common Knowledge: Pittsburgh (***CK:P***) is unique among school networking testbeds in focusing upon a major urban school district and attempting to develop a scalable and sustainable infrastructure for that school district. ***Bridging the Urban Landscape*** draws upon the work of ***CK:P*** and extends it to involve community centers, library resources and high-speed cable infrastructure. Extensive online documentation of this work is available through the World Wide Web at http://www.ckp.edu. We believe that the real world experience of these projects qualifies ***Information Renaissance*** to suggest directions that might be followed in the implementation of the Telecommunications Act of 1996. The following comments are offered in this spirit.

Experience.

Given the scope and complexity of the Telecommunications Act of 1996, we would like to develop a few focused principles which will guide our discussion. In the present section we describe these principles, and in the section which follows we offer recommendations based on these principles which can help the FCC in its implementation of the Telecommunications Act.

1. Scalability. The Act seeks to provide telecommunications services to all of the nation's classrooms. This implies the development of a scalable networking infrastructure. This has been a fundamental goal of the networking projects on which we have worked. In technical terms a scalable infrastructure has the property of supporting growing usage without a catastrophic degradation of service. In financial terms a scalable infrastructure will have costs which increase no more than linearly with the number of active users, since there will be no need to discard and rebuild portions of the infrastructure once the user population has passed some critical size.

2. Aggregation. A key to scalable infrastructure is the development of points of aggregation at all levels of the infrastructure. This involves both the aggregation of traffic, which is perhaps most relevant to the present comments, as well as aggregation of support and maintenance services, which is crucial to the successful wide-scale deployment of networking services for schools and libraries. Indeed, we have found that the aggregation of traffic and the aggregation of support and maintenance services have been keys to the success of networking projects in which we have been involved. In financial terms, successful aggregation means that the cost of providing service to a growing user population increases at less than a linear rate, *i.e.*, it provides economies of scale so that the cost per user actually decreases as the user population grows.

3. Evolution. A laudable goal of the Telecommunications Act is to foster the continual improvement of telecommunications services available to schools and libraries. In our own work we have seen that new technologies can offer dramatic reductions in the cost per unit bandwidth of network connectivity. Hence we believe that incentives should be built into the implementation of the Telecommunications Act so as to encourage the early deployment of newer, more efficient technologies. In the recommendations which follow we will propose specific mechanisms by which this can be accomplished.

4. Affordability. The Telecommunications Act breaks new ground in requiring that telecommunications services for schools and libraries should be affordable to these groups. This can be a difficult concept to quantify, given that few schools and libraries are knowledgeable in the latest developments in telecommunications technology. Nonetheless we have seen dramatic growth in school and community applications of networking technology once a minimal level of connectivity and support has been supplied to school or community populations. Therefore we believe that the provision of low-cost connectivity to schools and libraries will effectively leverage resources in these organizations and other collaborating organizations to complete the infrastructure needed for the effective use of new telecommunications technologies.

Recommendations.

The recommendations which follow apply to sections IV and V of the Notice of Proposed Rulemaking, which deal with Schools, Libraries and Health Care Providers and with Enhancing Access to Advanced Services for Schools, Libraries and Health Care.

1. Provision of the Local Loop. By its intrinsic nature and by the history of its development, the Local Loop (which connects a telecommunications customer to the nearest switching or distribution point) is probably the least competitive element of the entire telecommunications infrastructure. We believe that by facilitating access to the Local Loop, the Telecommunications Act can have the maximal effect in promoting the goals which Congress has described for schools and libraries in the formulation of the Act.

Recommendation: *We recommend that schools and libraries be provided with Local Loops which can provide bandwidth adequate to meet the demonstrated needs of each such entity. There should be no cost to the schools and libraries for this portion of the telecommunications service.*

What this recommendation means is that the cost to schools and libraries of any required telecommunications service will be the incremental cost to the provider of supplying the service at the switching or distribution point closest to the customer. Reimbursement from the universal service fund should be set in terms of the assured bandwidth in the Local Loop but independent of the exact technology deployed to the provide the service. The rate of reimbursement should be determined as an average across available technologies for regions of comparable population densities.

The effect of this recommendation will be two-fold. First of all, from the viewpoint of the affected schools and libraries, it will remove the burden of analyzing evolving transmission technologies and eliminate a substantial cost from the development of their telecommunications services. In our experience this will leverage resources from a number of directions. It will allow schools and libraries to concentrate scarce resources on the purchase of user devices, servers and essential peripheral equipment. It will encourage the development of collaborations to provide training and materials development. And it will encourage the aggregation of traffic for Internet connectivity and the aggregation of associated support services.

2. Competition beyond the Local Loop. We believe that a practical expression of the pro-competitive language of the Telecommunications Act can best be made through the development of a competitive market for regional and long distance telecommunications services.

Recommendation: *We recommend that school districts and library systems should have a range of options for connectivity beyond the Local Loop.*

We believe that the forces of a free and open market will provide services which will meet the Act's requirements of affordability, once the Local Loop is provided to schools and libraries at no cost.

3. Reliability. By requiring that the local loop be provided at no cost and by setting a reimbursement from the universal service fund which is tied to bandwidth and population density, as opposed to specific technologies, we hope to provide a strong incentive for telecommunications providers to use new and efficient technologies in the provision of the Local Loop to schools and libraries. It is important that all deployed technologies be reliable enough to meet the needs of network users in these organizations.

Recommendation: *We recommend that the services to schools and libraries should meet the same performance standards that are applied to standard commercial services.*

It is in the interest of both the telecommunications providers, who can use schools and libraries as testbeds for new technologies, and to students, teachers and library patrons that these services be of the highest quality available in the industry.

4. Monitoring. The FCC should create mechanisms for monitoring the success of the Telecommunication Act in providing advanced telecommunications services to schools and libraries.

Recommendation: *We recommend that bulk utilization statistics be compiled and published for the Local Loops provided to schools and libraries under the universal service provisions of the Telecommunications Act.*

Such monitoring will serve two purposes. First, it will provide a simple measure of whether the infrastructure deployed through the universal service fund is in fact being used by large numbers of students and teachers. Secondly, it will make it simple for schools to demonstrate their need for expanded bandwidth as their actual usage begins to saturate existing network links.

Summary.

The Telecommunications Act of 1996 offers an unprecedented opportunity to develop needed infrastructure in schools and libraries across the country and to enable these organizations to meet the educational goals of an increasingly technological society. Based upon experience with school and community networking projects in Pittsburgh, ***Information Renaissance*** believes that the universal service fund can act as a mechanism to encourage the timely deployment of new, fast and efficient telecommunications technologies for the nation's schools and libraries. This deployment can significantly enhance the educational environment of affected schools and allow all students, teachers and families to participate in the nation's evolving information economy.

Respectfully Submitted,
Robert D. Carlitz, Executive Director

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